FY05 Goal – Spark plug / energy efficiency

- Complete study to determine if modified spark plugs increase gas mileage

Determining whether making modifications to spark plugs would increase automobile gas mileage was target number 16 on the Pollution Prevention (P2)/Sustainability Committee's FY05 Activities and Targets (Short Term) list.

A local Northeast Ohio inventor holds a patent on a procedure he developed to round the metal tips of spark plugs in order to increase fuel efficiency. The rounded tip is intended to provide a more complete burn of fuel. The inventor had 20 years of experience in modifying plugs for many types of vehicles: cars (both modern and antique), motorcycles, drag racers, etc.; and received certificates for Excellence in Energy Efficiency Recognition from Ohio's Governor Taft for the years 1999 and 2001. It was decided a test would be done.

An initial test was conducted on two P2/Sustainability Committee member vehicles: 2000 Toyota Camry V6 and a 2002 Dodge Stratus with a 4 cylinder engine. The Camry was also outfitted with a check valve to modify the actions of its fuel injection system. The results were that miles per gallon (MPG) decreased about 2.5 MPG for the Stratus and about 1 MPG for the Camry.

The local inventor explained that the plugs were burning more efficiently, but since the gas pressure was the same as when fuel was being burned less efficiently (with the old plugs), the gas pressure should be turned down. That is, the benefit being received from the modified plugs was more power due to more complete burn; and turning down the gas pressure would provide better MPG.

At this point, the Stratus and Camry dropped out of the test. The test was begun again with a 1995 Dodge Neon. The idea was to test not only the performance of the modified plugs, but the effects of the reduction in gas pressure. That is, would the modified plugs increase the MPG, or would reducing the gas pressure alone create the MPG benefit?

The results of the Neon test are attached. As a disclaimer, this was not a scientific test: there was only one vehicle (no replication), many other factors could figure in that may have affected MPG (weather, driving conditions, fuel additives, etc.). This is anecdotal information on one vehicle, but the results are somewhat convincing. It appears that:

- Reducing gas pressure, especially by 10 pounds per square inch (psi) - from 50 psi to 40 psi - increases MPG by 4% or more. For example, by using

unmodified old plugs and reducing gas pressure to 40 psi, MPG increased 3.94%. Installing new plugs at 40 psi increased MPG 18.69%; the new plugs at 50 psi increased mileage only 10.42%.

But reducing gas pressure may result in engine damage due to early detonation (audible or inaudible). Detonation creates a vibration that may loosen engine parts. One mechanic advised that gas pressure should be kept in line with the manufacturer's design and specs.

- Plugs modified by the inventor appeared to reduce MPG by up to 10% or more. When new plugs were installed at 40 psi, then modified and reinstalled, MPG was reduced 10.5%.

Summary:

It appears that the spark plug modification reduces MPG by up to 10% or more. Reducing gas pressure increases MPG by 4% or more, but may result in engine damage.

Merely replacing old, worn spark plugs with new spark plugs may result in 10% or better fuel efficiency.

It may also be posited that modifying a plug (which reduces MPG ~4%) and using the modified plug to replace a worn plug (which increases MPG ~10%) may increase MPG ~6%. This could make it appear that the plug modification itself is reducing MPG. Reducing gas pressure at the same time would further increase MPG ~4%, adding to the appearance of modified plug performance.

Being an unscientific study, with few test vehicles, these results are purely anecdotal. Our local inventors should be given the benefit of the doubt. Any further breakthroughs that may create a convincing argument for fuel efficiency would be given new consideration.

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